Quantifying Culture

(Class 4)

: Evaluating Open Science Practices in Academic Research

Alessio Palmisano
University of Turin
Department of Historical Studies

Layout

- Open Science and Open Access
- Open Data
- Open Methods
- Open Publishing
- Solutions

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What is Open Science?

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*"to make the primary outputs of **publicly funded** research results – publications and the research data – **publicly accessible** in digital format with no or minimal restriction"*

OECD, 2015, p.7. Making Open Science a Reality

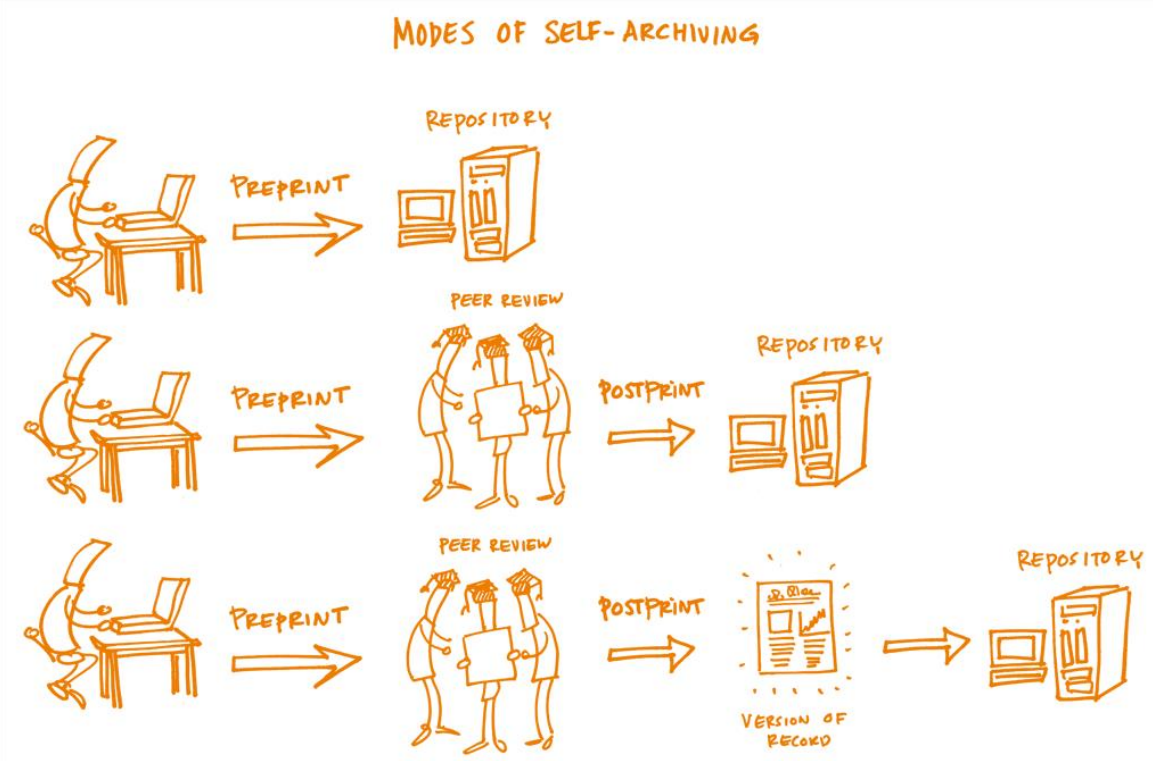
OECD
BETTER POLICIES FOR BETTER LIVES

Budapest Open Access Initiative (2002)

*"**Removing** access **barriers** to this literature will accelerate **research**, enrich **education**, share the **learning** of the rich with the poor and the poor with the rich, make this literature as useful as it can be, and **lay the foundation for uniting humanity** in a common intellectual conversation"*

Two recommended strategies:

- Self-archiving
- Open-Access Journals



Budapest Open Access Initiative (2022)

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"Open access is not an end in itself, but a means to further ends. Above all, it is a means to the **equity**, **quality**, **usability**, and **sustainability** of **research**. Our four high-level recommendations address systemic problems that obstruct progress toward these ends."

Four recommended strategies:

- Host OA research on **open infrastructure**.
- **Reform** research assessment and rewards to improve incentives.
- Promote models which benefit **all regions of the world**, which are controlled by academic-led and non-profit organizations.
- Favour **inclusive publishing** and distribution channels that never exclude authors on economic grounds.

Open Access Policies

To promote the openness, accessibility, usability, interoperability, citizens engagement and inclusivity.

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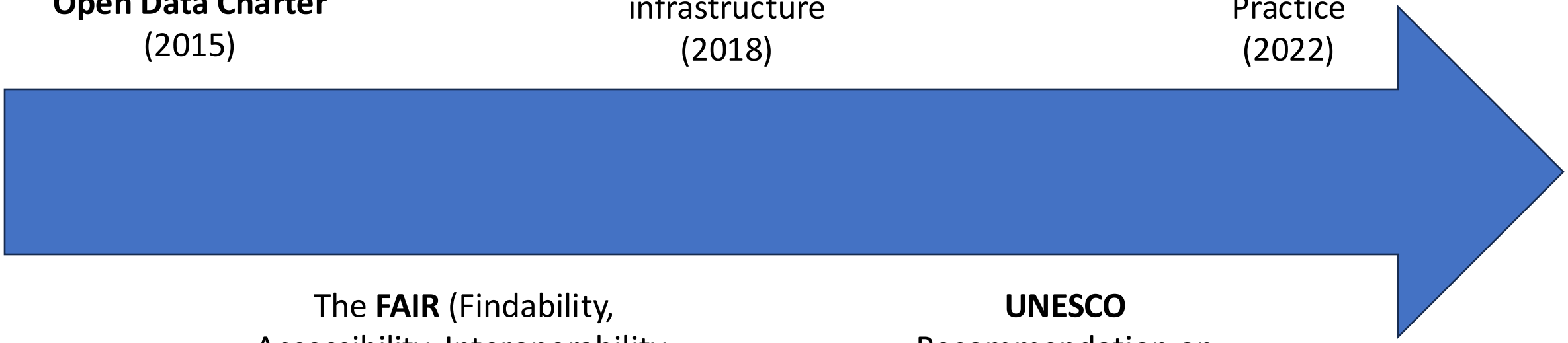
Open Data Charter (2015)

OpenAIRE communication infrastructure (2018)

EAA Code of Practice (2022)



The **FAIR** (Findability, Accessibility, Interoperability, and Reusability) guiding principles (2016)

UNESCO Recommendation on Open Science (2021)

What OA Implications in Archaeology

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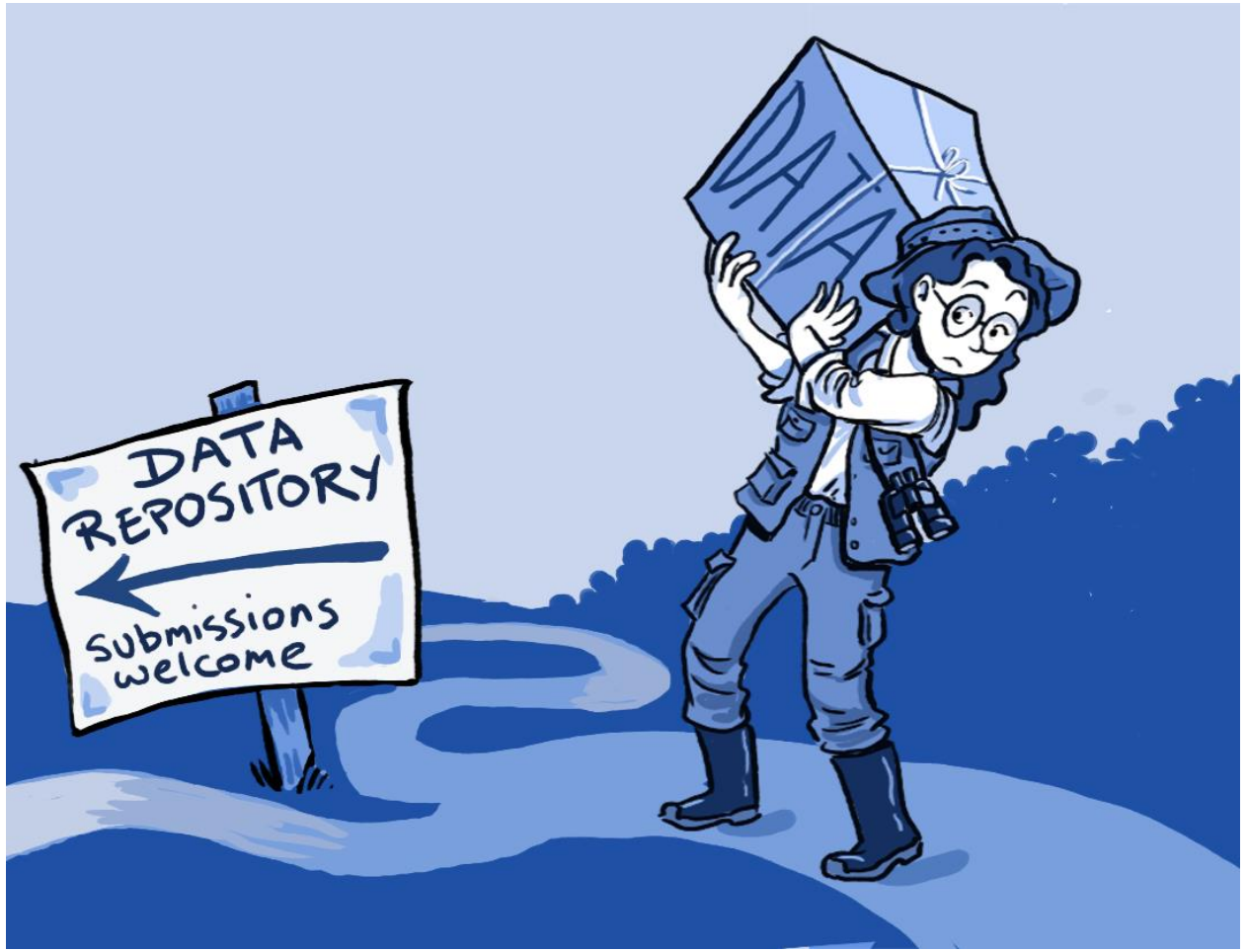
- The **preservation** of archaeological sites
- The **respect** of values held by specific local communities
- The enhance of **digital divide**
- Scientific **publications modalities**
- Data "**plagiarism**"



What Next ?

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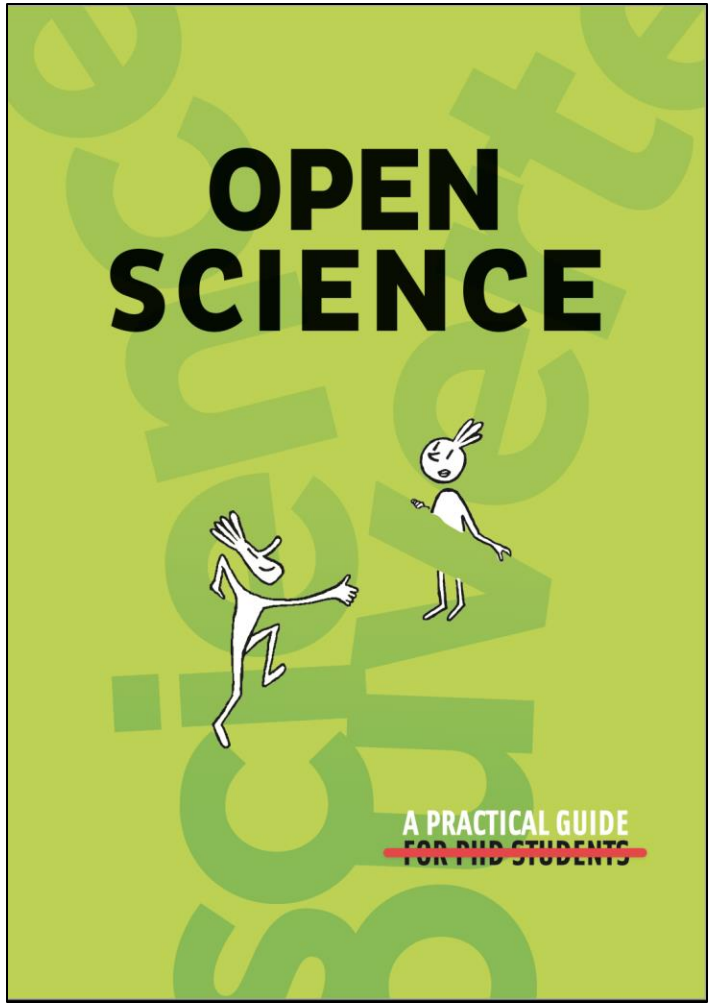
- Developing a **“protocol”** of good Open Science practices
- **Training** to Open Access principles
- **Citizen archaeology**
- **Collaborative** research platforms



https://rdr.ucl.ac.uk/articles/media/Open_Science_a_practical_guide_for_PhD_students/20585898

Open Science in practice

OS has been proposed as a sort of **corrective** for some of the issues highlighted above and it aims to promote:

- **Transparency**
- **Equity**
- **Inclusiveness**
- **Collaboration**

It can be perceived as a **movement**, a **goal**, a **framework** of policies, or even a **research strategy** (Fecher and Friesike 2014).

Fecher, B., Friesike, S. (2014). Open Science: One Term, Five Schools of Thought. In: Bartling, S., Friesike, S. (eds) Opening Science. Springer, Cham. https://doi.org/10.1007/978-3-319-00026-8_2

Open Science in practice

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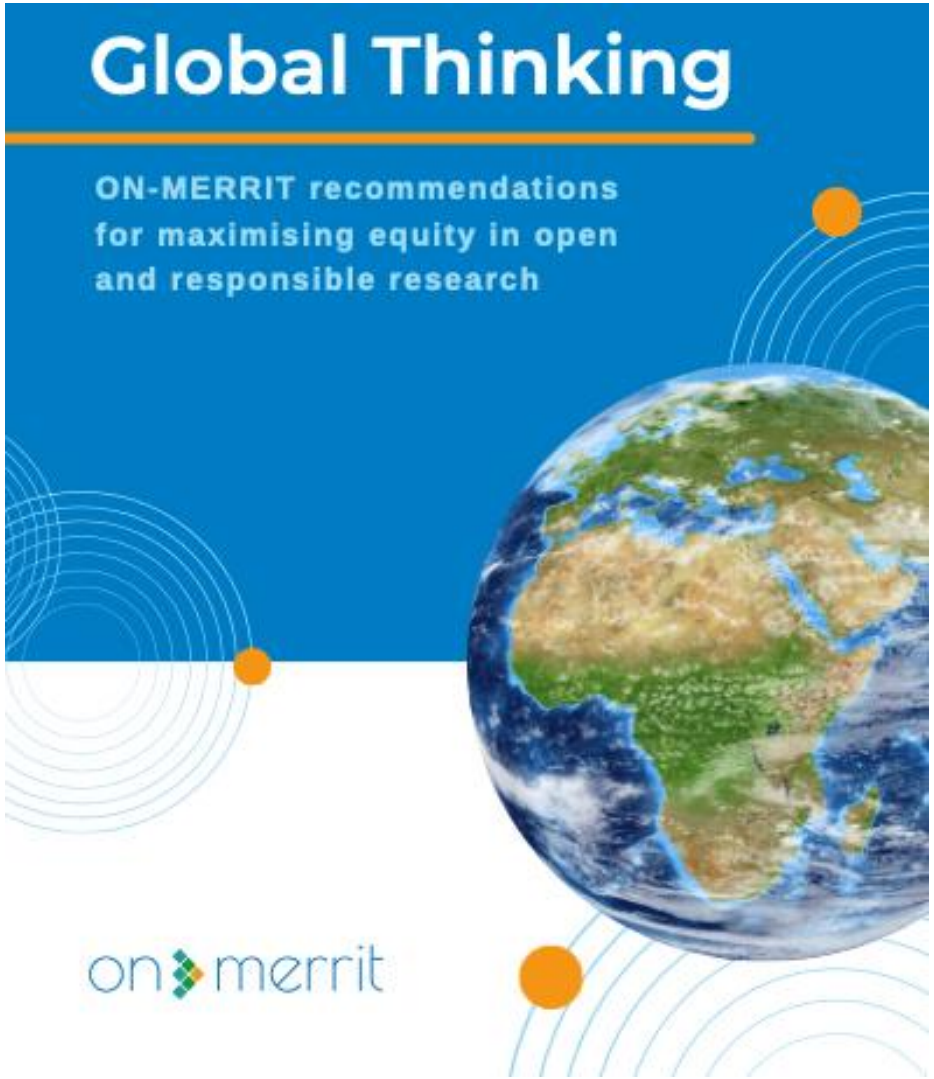
The project ON-MERRIT highlighted that the implementation of OS practices has **widened** existing **disparities** between **rich** and **poor** research institutions and published **a set of recommendations** for maximising equity in open research. https://on-merrit.eu/



Cole, N. L., Reichmann, S., & Ross-Hellauer, T. (2022). Global Thinking. ON-MERRIT recommendations for maximising equity in open and responsible research (1.0). Zenodo. https://doi.org/10.5281/zenodo.6276753

The Data Deluge

In recent years, archaeology has experienced an increasingly availability of open access digital data.

- Foster **interdisciplinary** approaches
- Easy access to **reusable** data
- **Reproducibility** of analyses (workflows, programming scripts, etc.)

Bevan, A., 2015. The data deluge. *Antiquity, 89*(348), 1473-1484.

Open Data

General repositories

zenodo

HARVARD Dataverse

figshare

Databases

3k14c

ARCHAEOGLOBE

14 Med AfriCarbon

Archaeology repositories

OPEN CONTEXT

tDAR The Digital Archaeological Record
A SERVICE OF DIGITAL ANTIQUITY

ads ARCHAEOLOGY DATA SERVICE

Institutional repositories

UCL Discovery
Unlocking UCL research

LMU Universitätsbibliothek
OPEN ACCESS LMU

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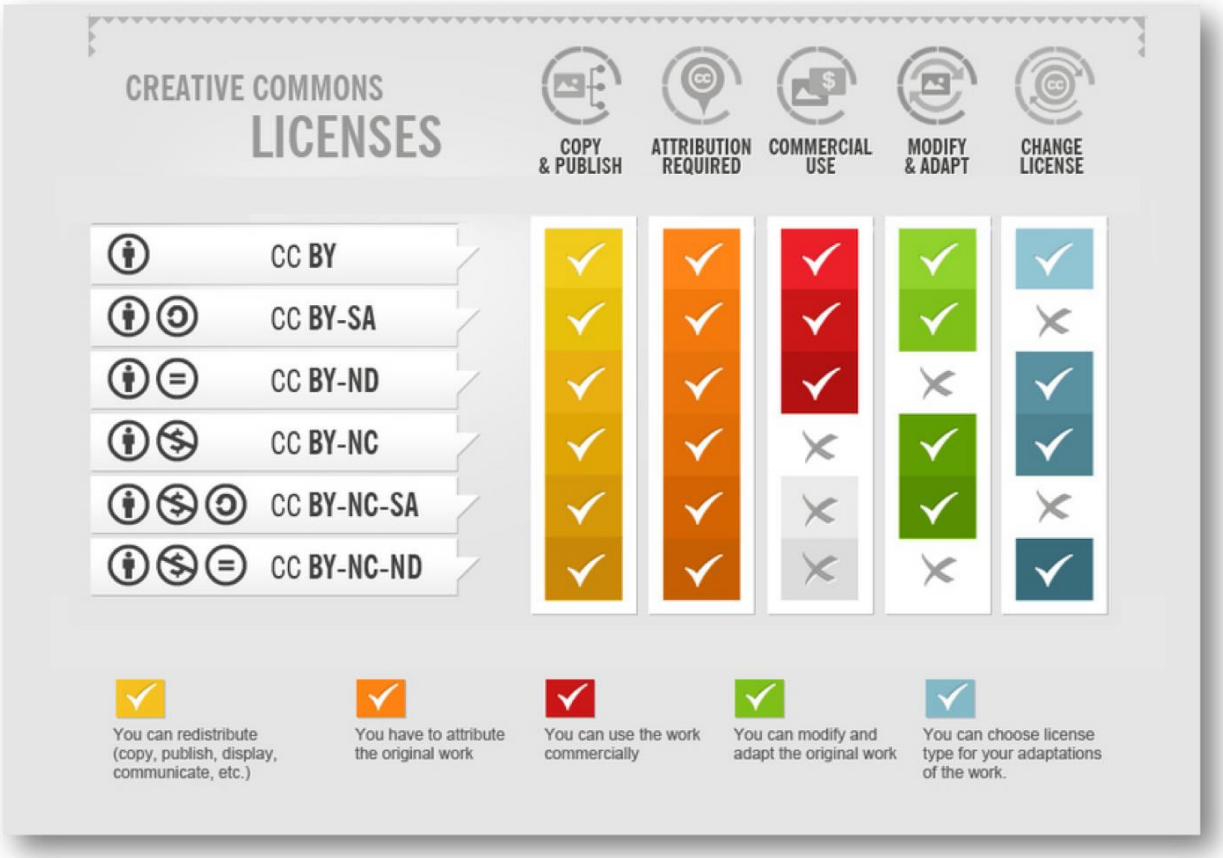
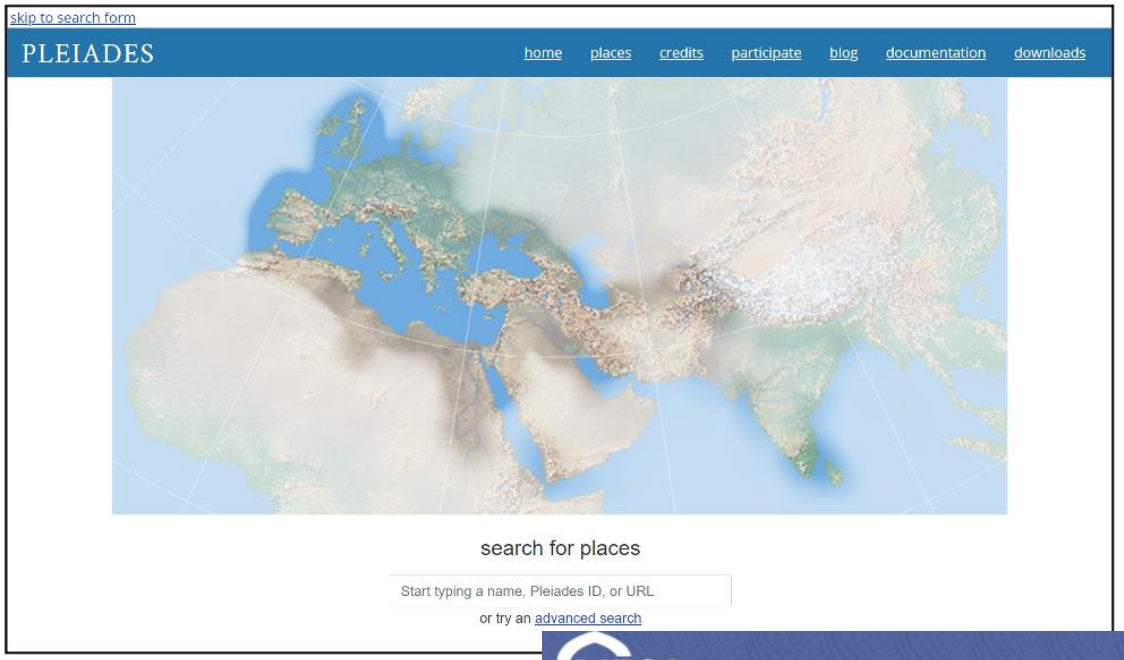
A CC license is used when an author wants to give other people the right to share, use, and build upon a work that the author has created.



Creative Commons Licenses, Foter.com, CC BY-SA 2.0, https://foter.com/blog/how-to-attribute-creative-commons-photos/

Online Databases

https://pleiades.stoa.org/



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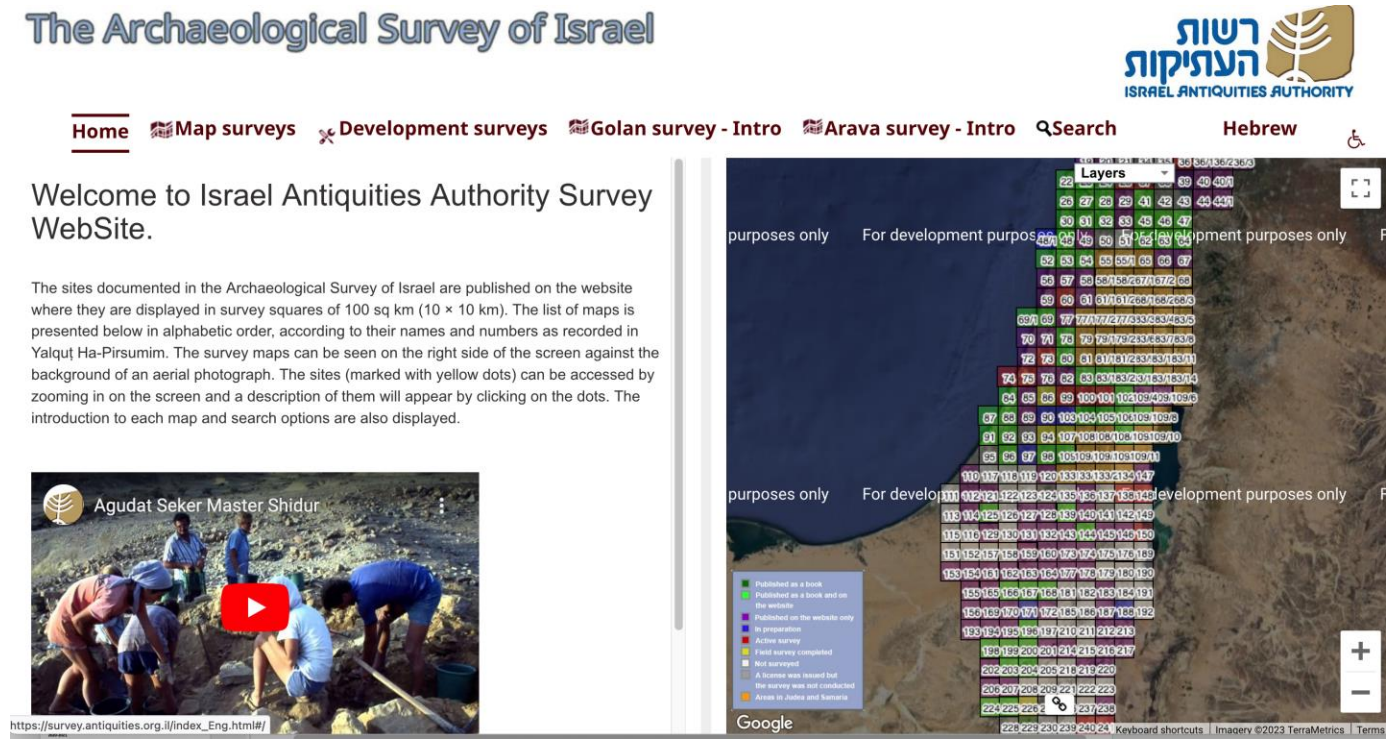

http://megajordan.org/

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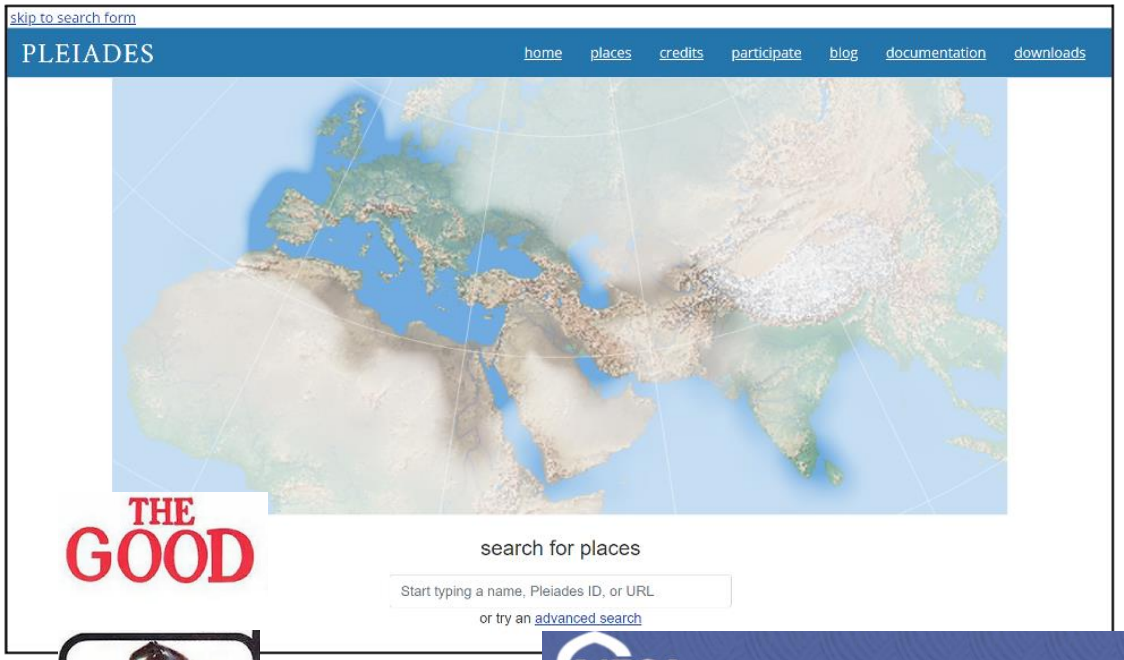
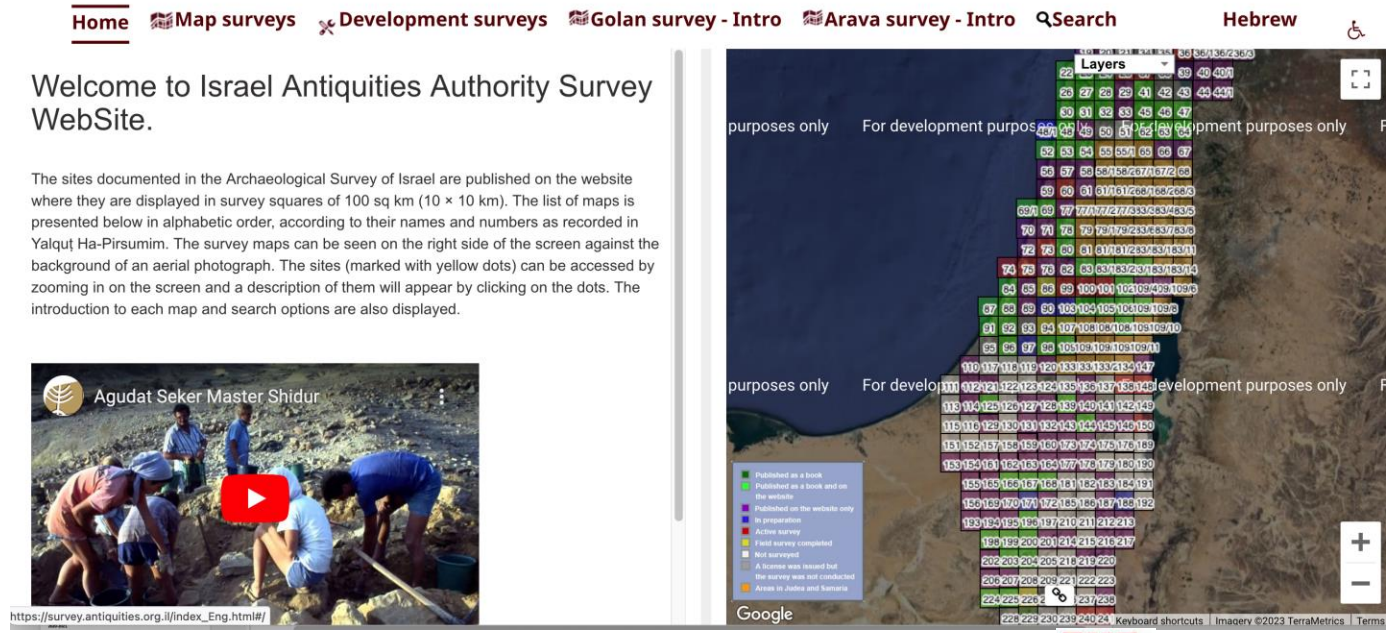


THE GOOD

https://survey.antiquities.org.il/index_Eng.html#/

The Archaeological Survey of Israel

רשות העתיקות
ISRAEL ANTIQUITIES AUTHORITY



THE

http://megajordan.org/

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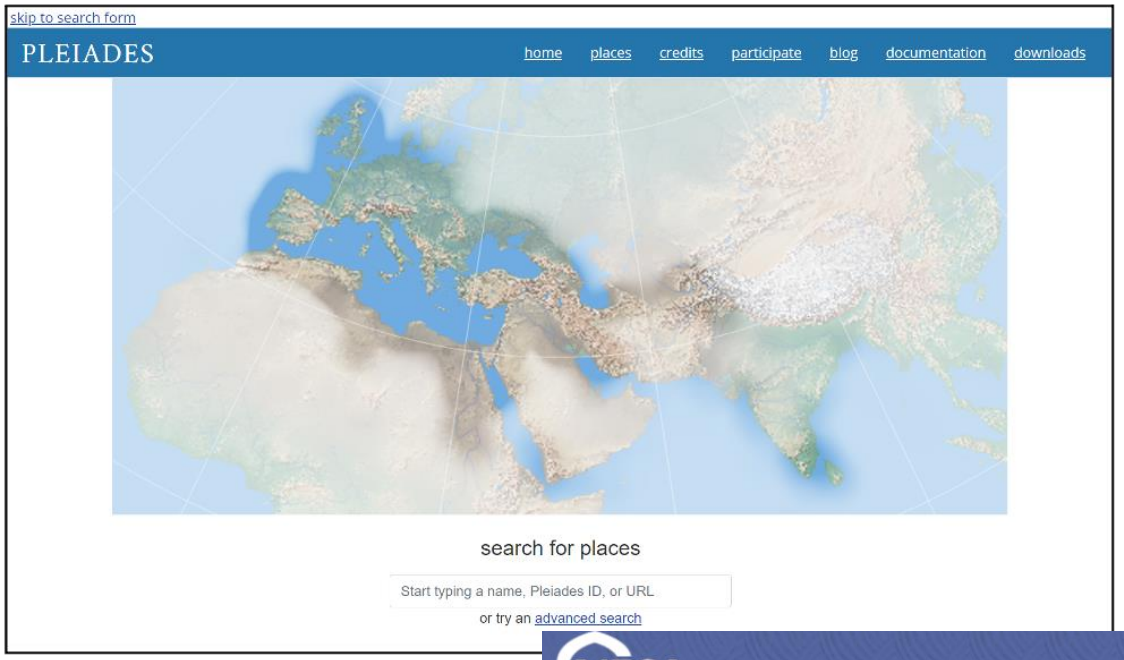

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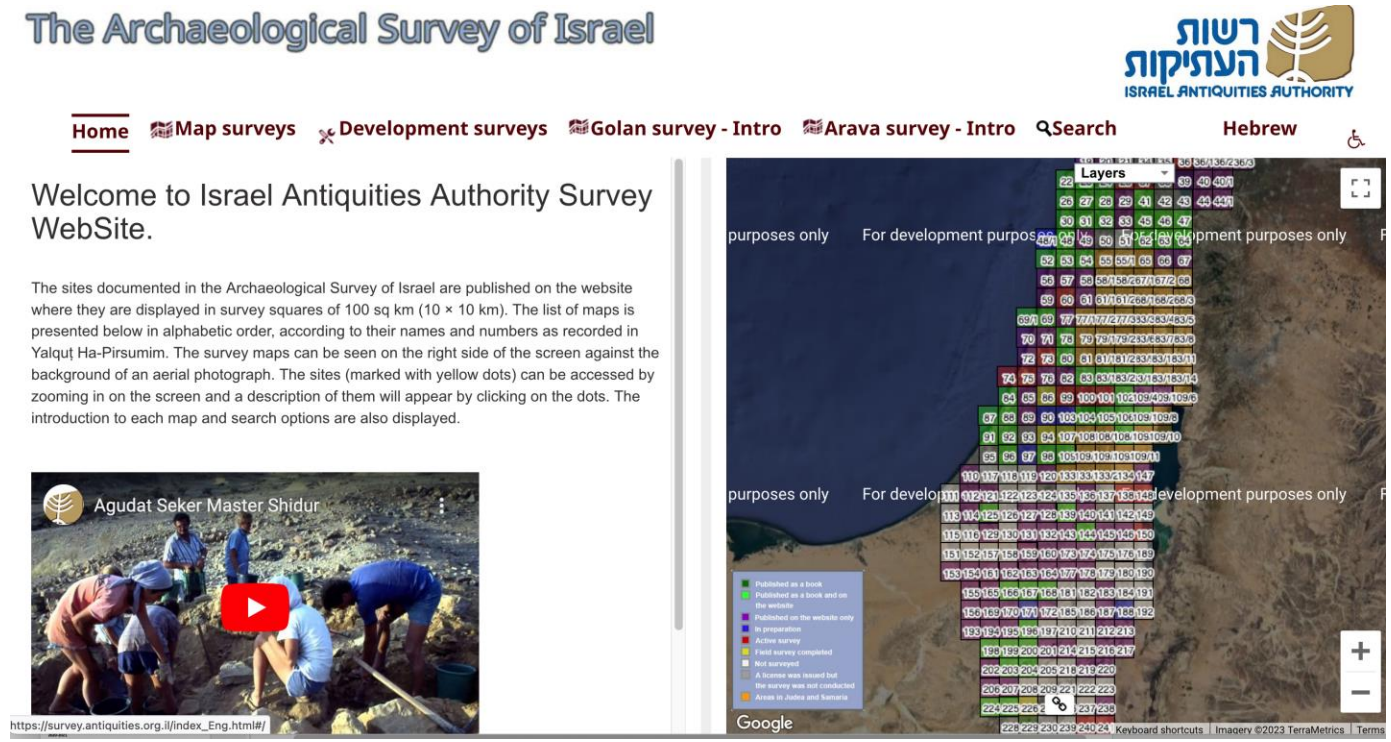

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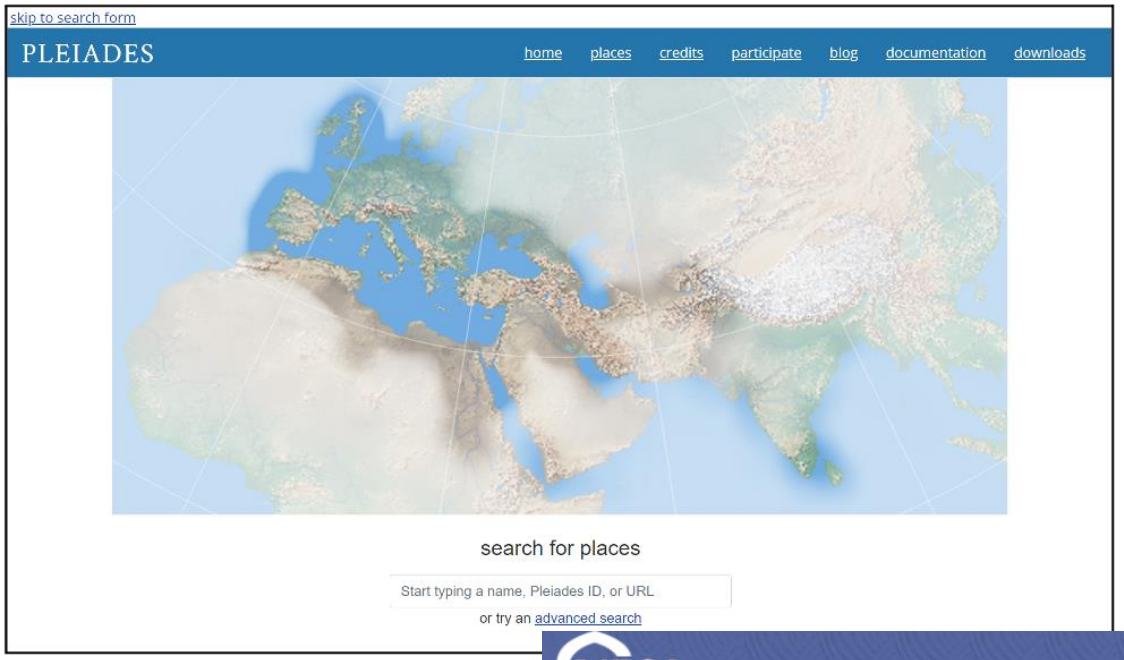

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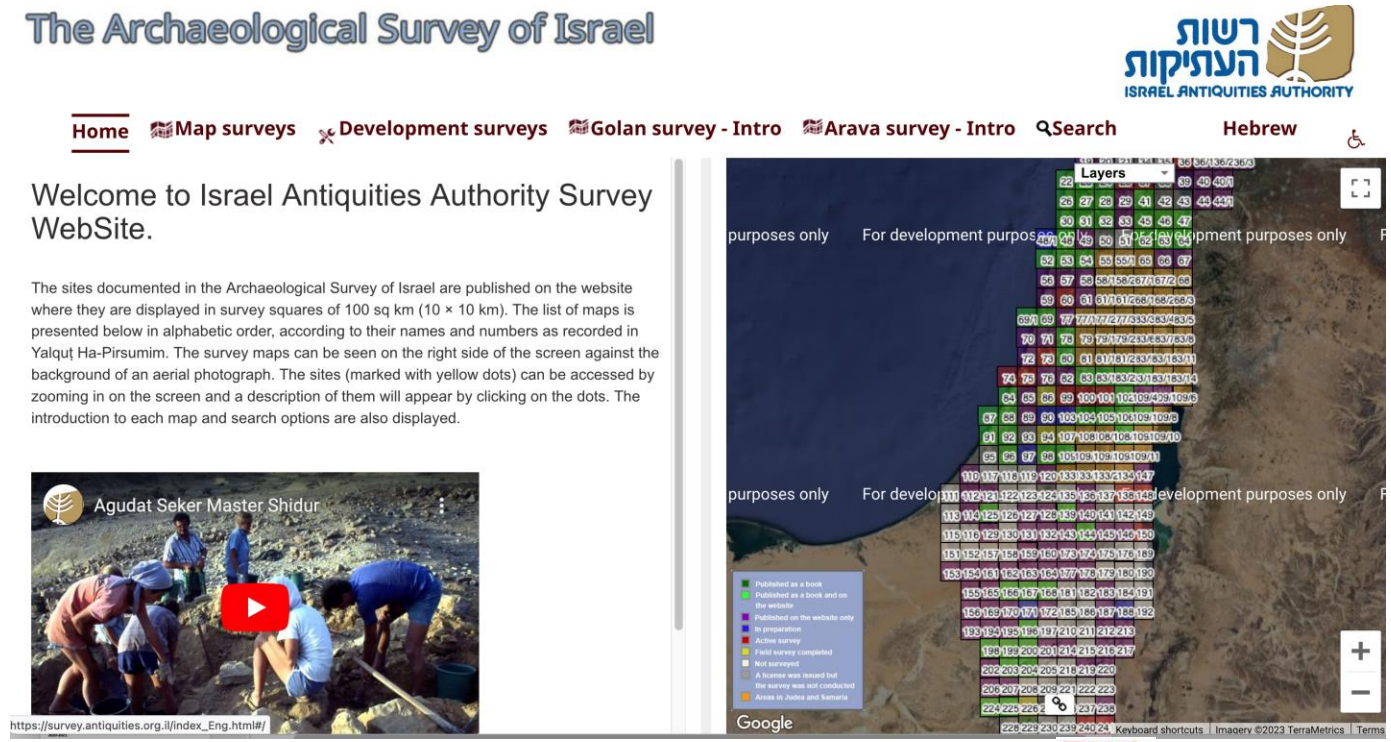
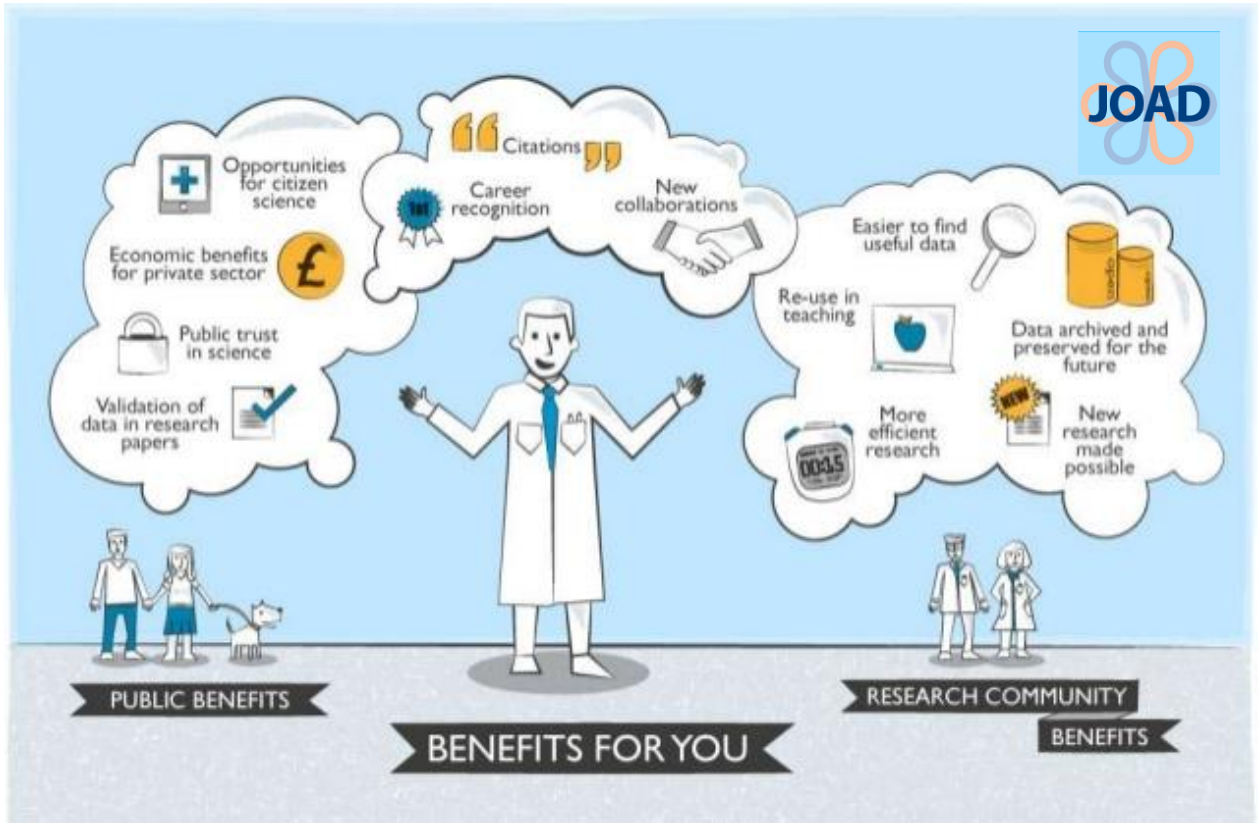


http://megajordan.org/

THE UGLY

Data Papers

Data papers are designed to make other researchers **aware** of data that is of potential use to them.



- **Description** of **methodology** with which a dataset was created.
- Description of the dataset itself
- Details about the **potential reuse** of the data.
- Data are **cited** and **re-used**.

Archaeology

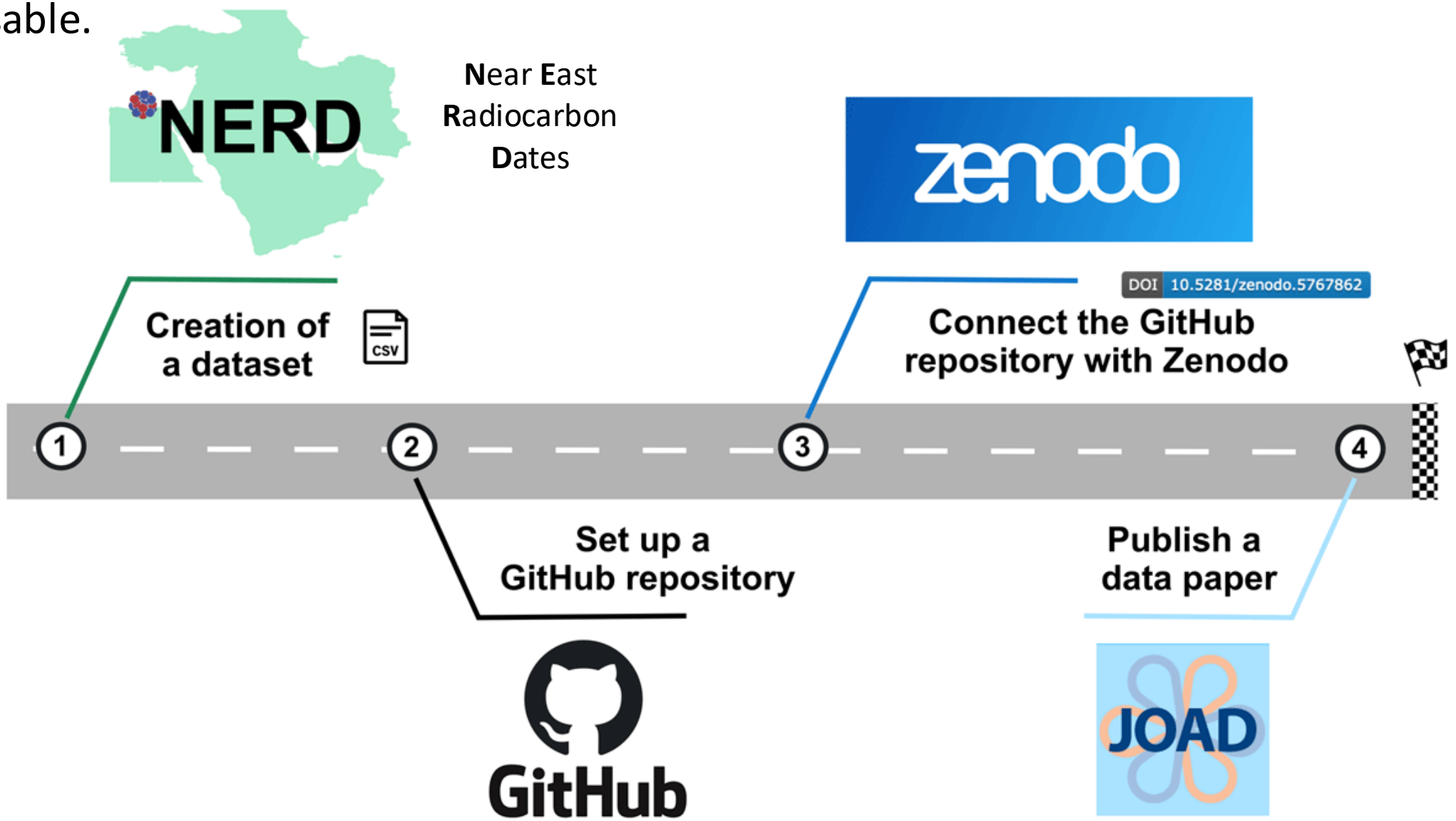
- **Journal of Open Archaeology Data (JOAD)**
- **Archeologica Data**

General

- **Scientific Data (Nature)**

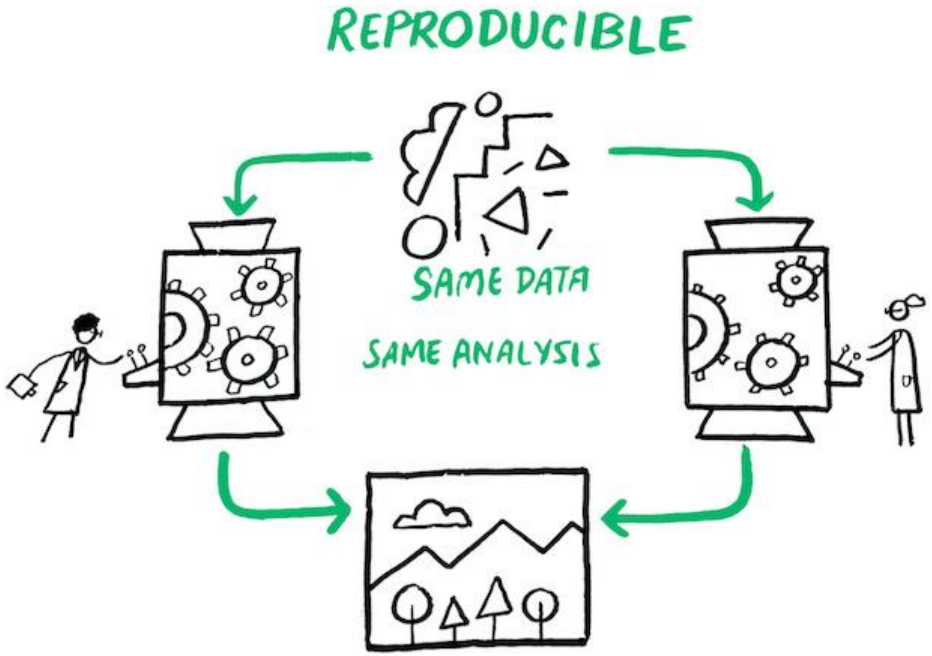
The road map to the FAIR principles

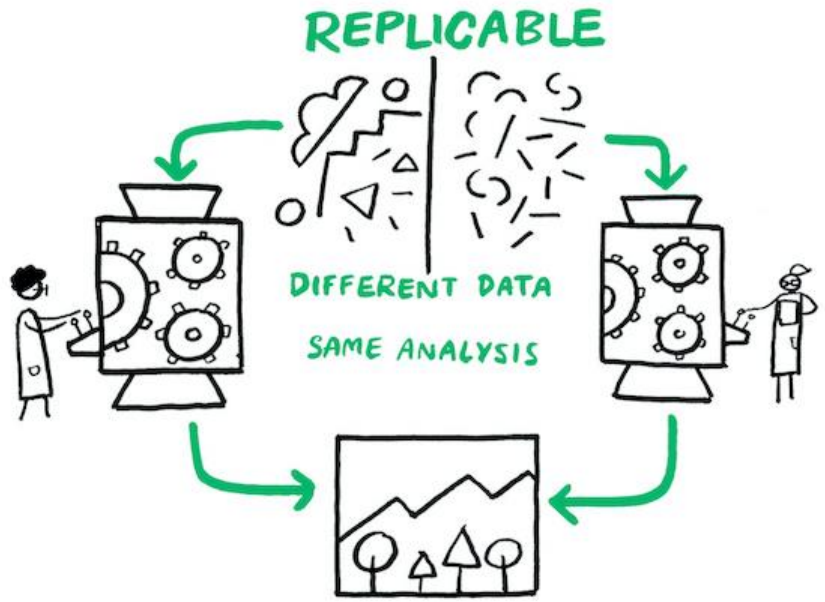
There are several steps that need to be implemented before making our data easily findable and reusable.



Open Methods

- **Reproducible:** A result is reproducible when the ***same*** **analysis** steps performed on the ***same*** **dataset** consistently produces the *same* answer.
- **Replicable:** A result is replicable when the ***same*** **analysis** performed on ***different*** **datasets** produces qualitatively similar answers.





State of the Art

A total of **621** publications from four method-based archaeology journals published in **2020-2021**.

- *Journal of Archaeological Science* (n=300)
- *Journal of Archaeological Method and Theory* (n=53)
- *Journal of Computer Applications in Archaeology* (n=30)
- *Plos One* (n=238)

Data	Data Supplementary	Data DOI	Reproducibility
290	215	75	76
46.7 %	34.6%	12.1%	12.2%

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THE UGLY THE GOOD

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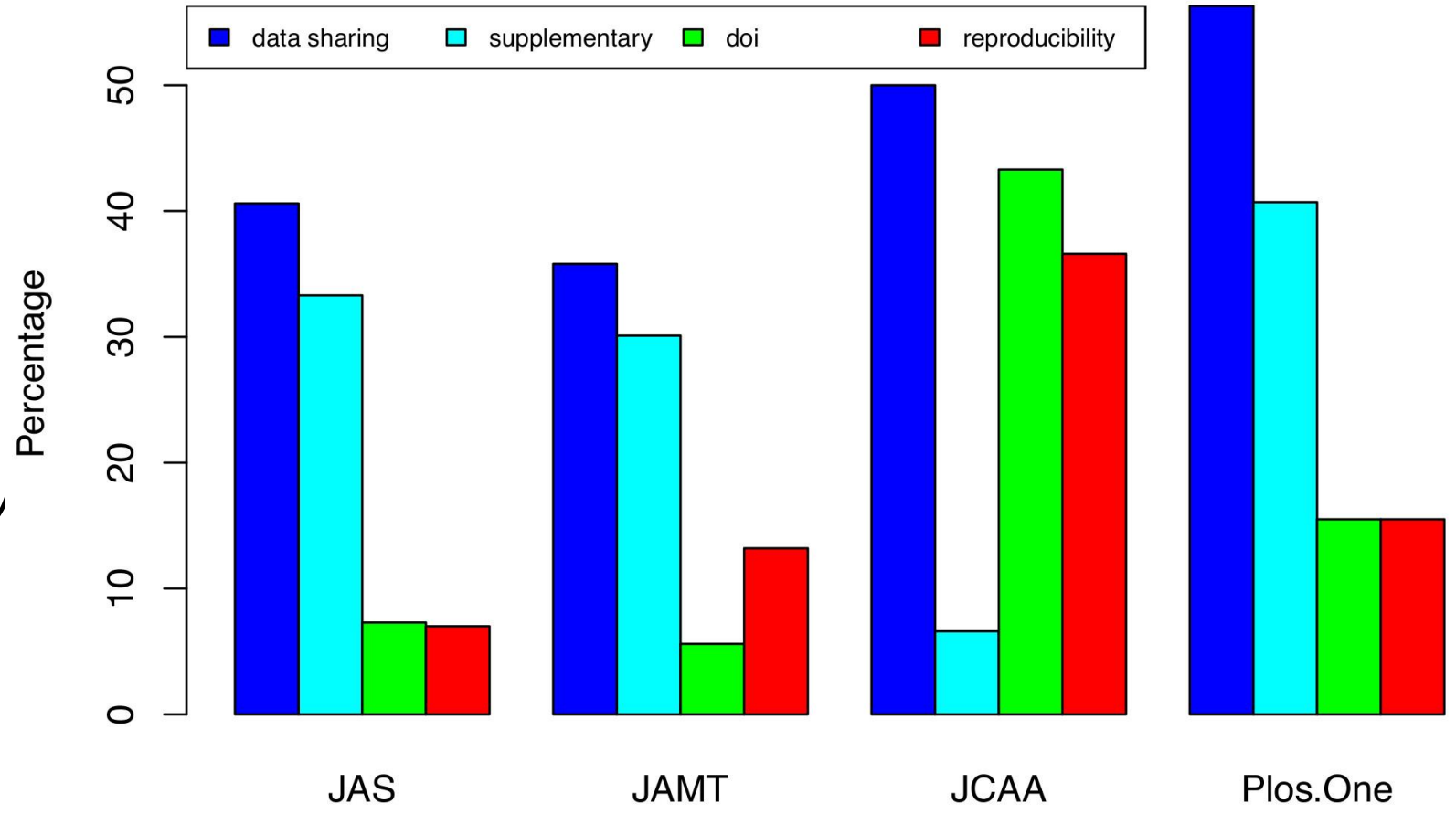
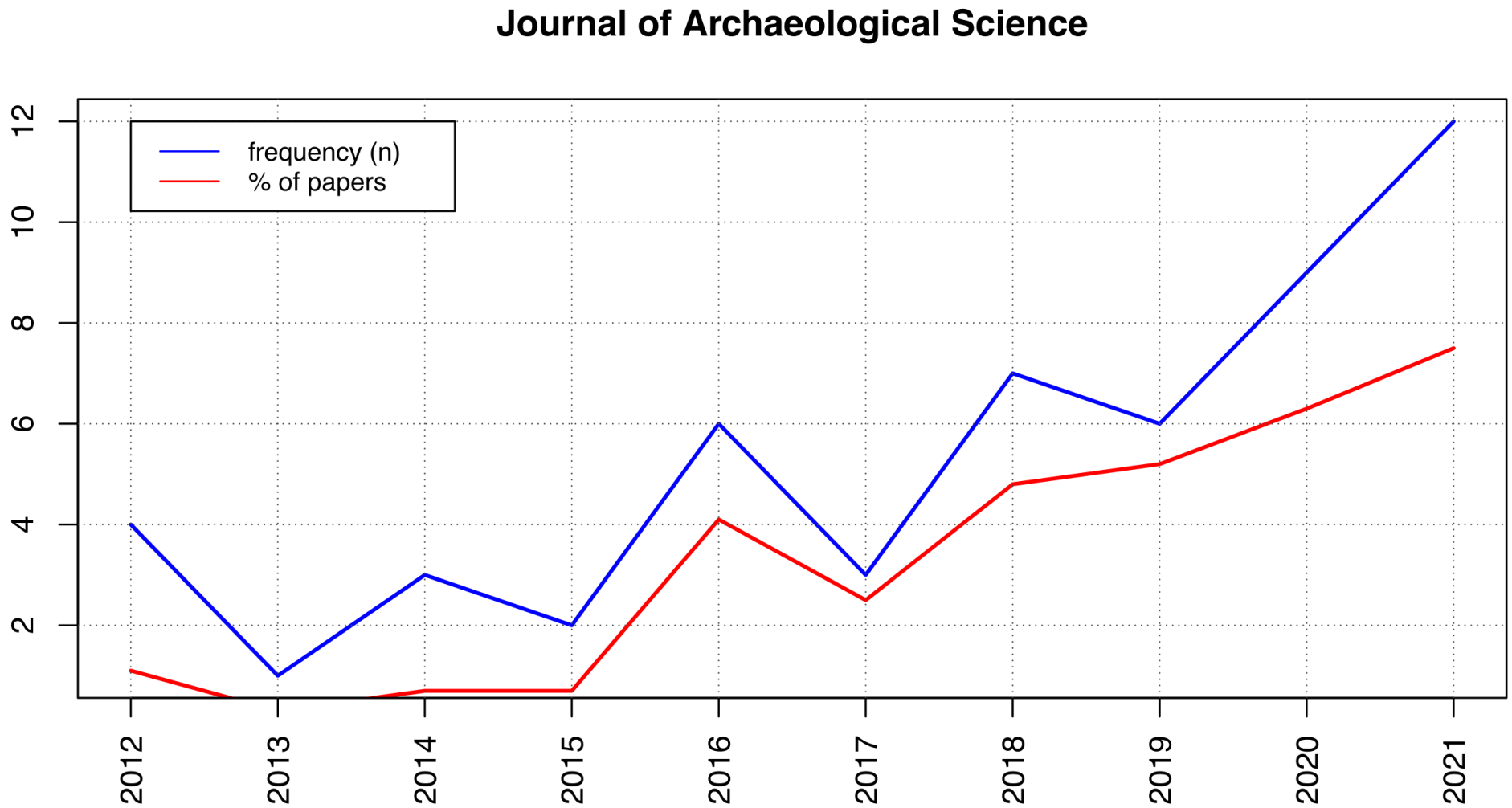


The Road to Reproducible Research

53 papers out of **2238** published via *Journal of Archaeological Science* (2012-2021) include scripts and instructions for reproducible research.



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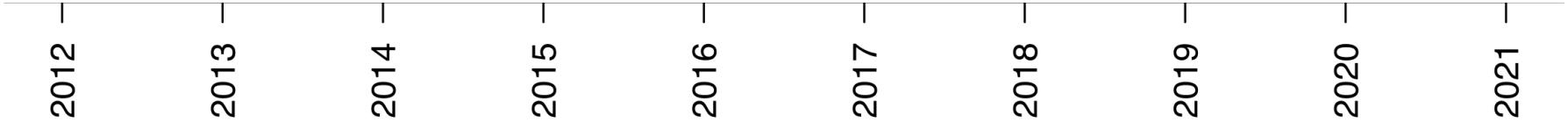
Journal of Archaeological Science

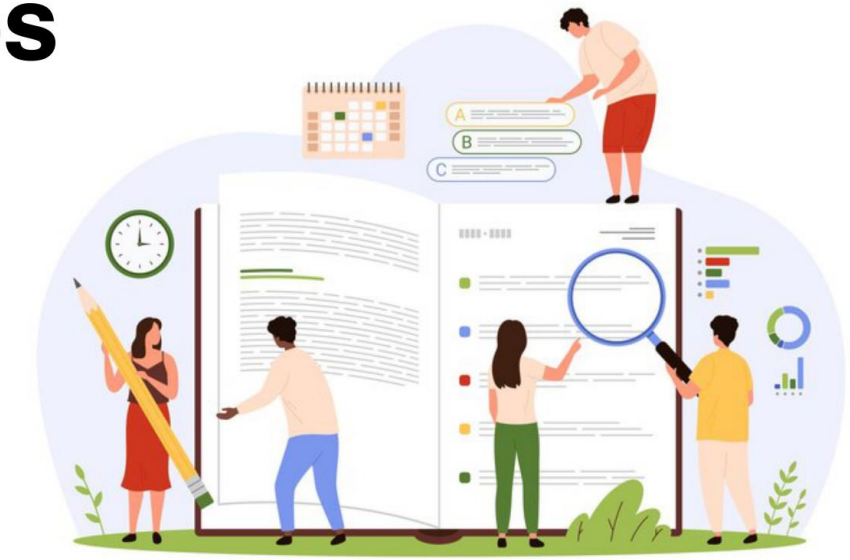
19 October 2023

JAS Introduces Reproducibility Prize

Acknowledging that reproducibility is a cornerstone of scientific research, JAS has launched a Reproducibility Prize for papers that share in a transparent, clear and detailed manner their data, protocols and/or code. Any paper published at JAS during 2022 (volumes 137-148) was deemed eligible. All Editorial Board members were invited to submit their nominations and the winner was selected based on a majority vote. The prize amounts to $500 and the winning article gets to be highlighted via Elsevier's social media channels. Moreover, if the winning article is subscription-based, it will be made free to view for a year.



OA Publishing Routes



a

Gold Open Access

Payment to Open Access journals
or hybrid journals to publish a paper

Green Open Access

No payment for the Open Access
dissemination of a paper manuscript

b

Pre-print manuscript

- Pre-print repositories
- Author's homepage
- Institutional repositories

Post-print manuscript

- Author's homepage (no embargo period)
- Institutional repositories (embargo period)

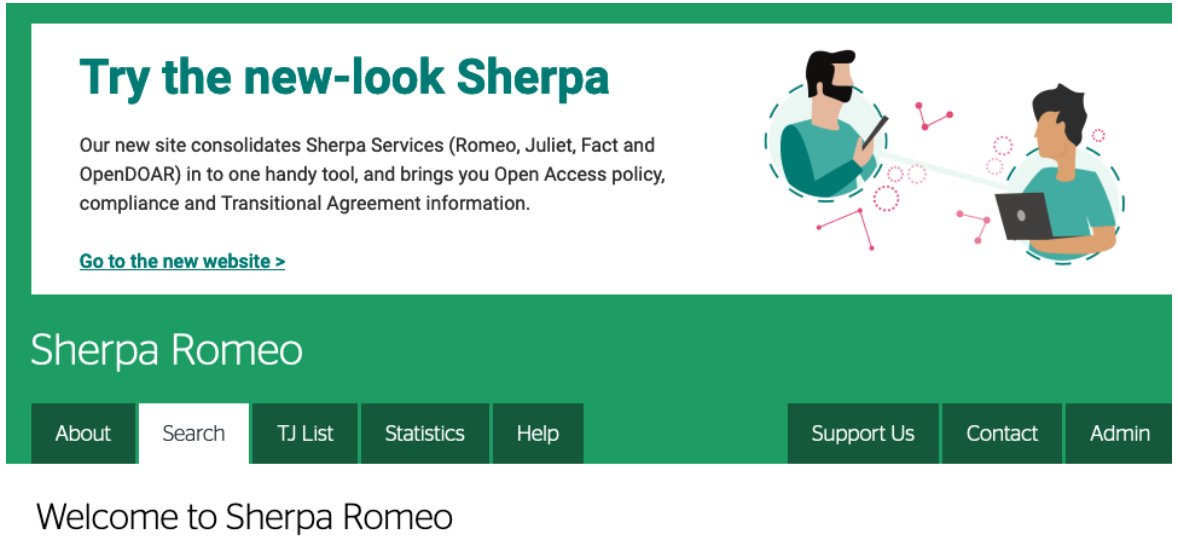
c

Diamond Open Access

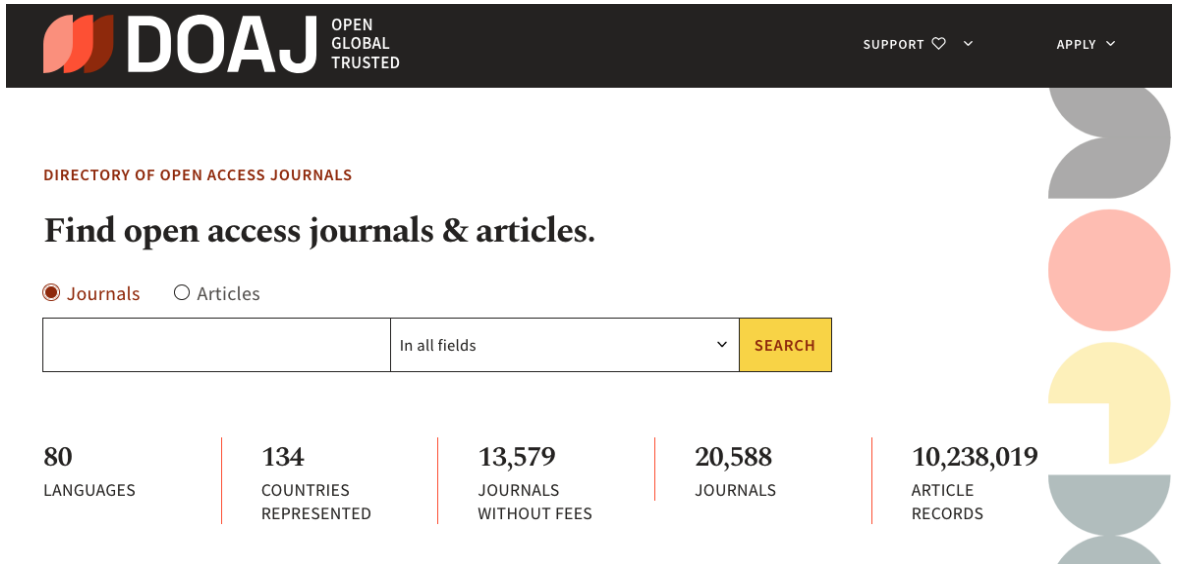
No payment to Open Access
journals to publish a paper

Open publishing

- SHERPA/RoMEO, which is an online resource providing information about copyright and self-archiving policies of academic journals (https://www.sherpa.ac.uk/romeo/).



- **Directory of Open Access Journals (DOAJ)** is a website that hosts a community-curated list of open access journals (https://doaj.org/).



The road map to the FAIR principles

1. Manuscripts freely available online as preprints:

- **SocArXiv**
- **SSRN**

2. Disciplinary **communities** providing **peer review** services validating **preprint** to to give them the same value as articles published in traditional journals.

Peer Community In Evolutionary Biology

Peer Community In Ecology
Free and transparent preprint and postprint recommendations in ecology

PCI Archaeology

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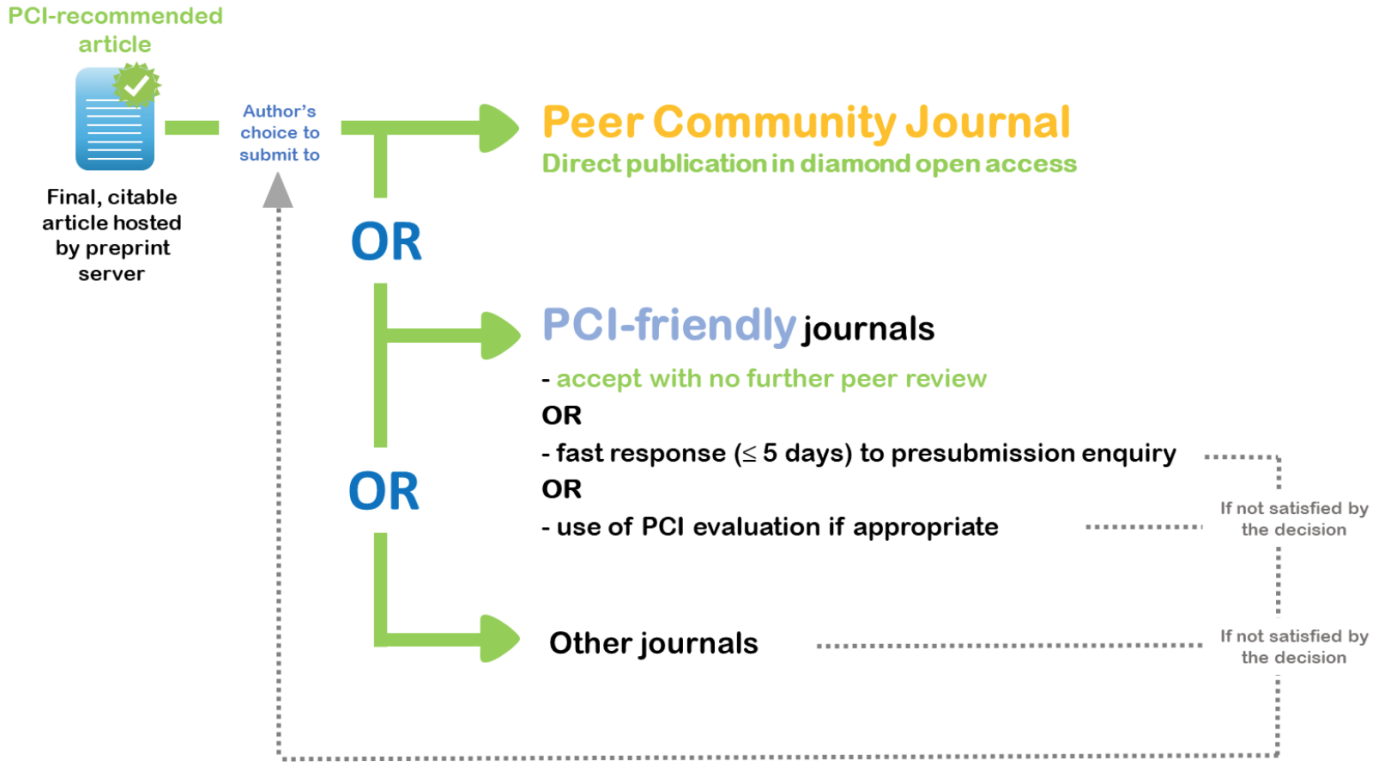


Ethical Issues

Academic research issues

- large datasets citing pre-existing sources
- Practices of data-hoarding
- Unequal access to Gold open access

SOLUTIONS

- Sharing of datasets under two kinds of licenses:

Share — copy and redistribute the material in any medium or format for any purpose, even commercially.
Adapt — remix, transform, and build upon the material for any purpose, even commercially

Share — copy and redistribute the material in any medium or format for any purpose, even commercially.
ShareAlike — If you remix, transform, or build upon the material, you must distribute your contributions under the **same license** as the original.

Under the following terms:

Attribution — You must give appropriate credit

Ethical Issues

Research field issues

- Exposure of archaeological sites to looting
- Digital colonialism
- Underrepresentation of social groups (e.g. indigenous communities)

SOLUTIONS

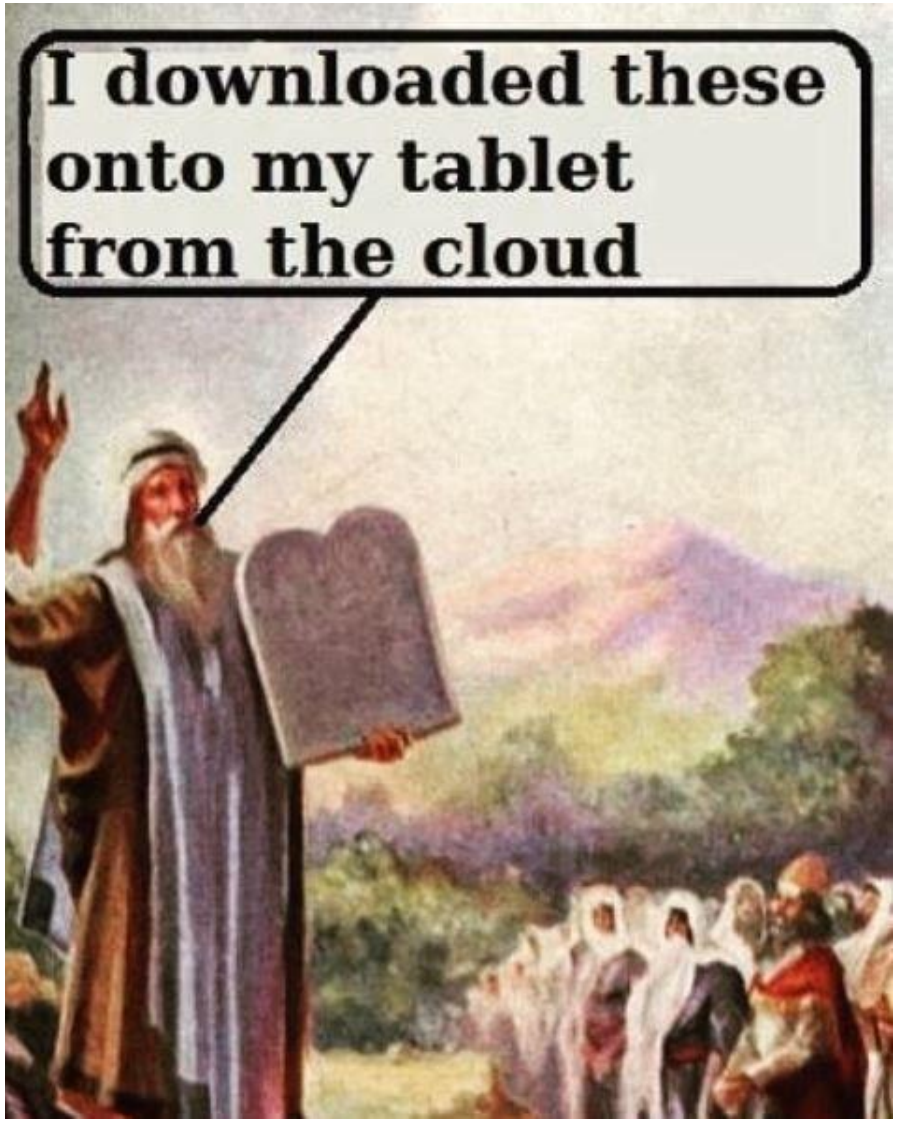
- Restricted access to sensitive materials
- Developing of participatory policies
- Engagement of local communities

What is next?

- More **transparency** and **equity** in data and publication sharing practices.
- Making accessible **reproducible** workflows.
- Depositing data and codes for analyses in **open access repositories.**
- **Teaching** at undergraduate level practices of data sharing and reproducibility.
- Developing an international **protocol.**

A decalogue of OS practices

1) Publish scholarly work **electronically**.
2) Deposit data in an online, freely accessible **repository** with a persistent **DOI**.
3) Store data in its most **unprocessed state** possible.
4) Utilize **open formats** for data storage to ensure interoperability (e.g. CSV, PNG, SVG, GeoJSON).
5) Accompany the corresponding dataset with relevant **metadata**.
6) Disseminate data under an **open license** (CC0, CC-BY).
7) Enhance research **reproducibility** by providing raw data and a detailed workflow.
8) Publish a **data paper**.
9) Publish your article through "**Diamond Open Access**" or "**Green Open Access**" options.
10) Consider "**Gold Open Access**" publication only in fully open-access journals.



Thank you

USEFUL LINKS

Paper from Journal of Open Archaeology Data
https://openarchaeologydata.metajnl.com/articles/10.5334/joad.90
Repository of the matching dataset: https://zenodo.org/records/5767862

Example of dataset's structure for sharing data and reproducible research:
https://zenodo.org/records/4322979

Practical 1

A researcher asks for your assistance in disseminating his data online and provides you with his digital archive.

- Did you notice any issue in the provided dataset?
- How would you proceed to make the dataset adhering to the FAIR principle?

Discuss it in a group and modify the original dataset so that it adheres to international standards.

Practical 2

What would you do to publish your your paper **Green Open Access?**

Scenario 1: the paper is under review in the journal *Nature*

Scenario 2: the paper has ben accepted and published on *Nature*

Discuss about it and provide some solutions.